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TEAC®

AN-60

NOISE REDUCTION UNIT

INSTRUCTION MANUAL



TEAC CORPORATION

Your new TEAC Noise Reduction Unit has been manufactured under the strictest quality control procedures. Each unit has been thoroughly tested at the factory, should any damage have been incurred during transit or should you have any doubts as to its performance, contact your dealer as soon as possible.

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This manual outlines the operation and calibration procedures required to properly utilize the TEAC AN-60 Noise Reduction Unit with your tape deck. By closely following the procedures contained herein you will be able to calibrate the Dolby System correctly and produce recordings of a quality never before attained. Recording techniques will vary with individual tape decks and with different types of recording tape. No one set of rules can possibly cover all situations. A degree of judgement and some experimentation may be required to obtain optimum results.

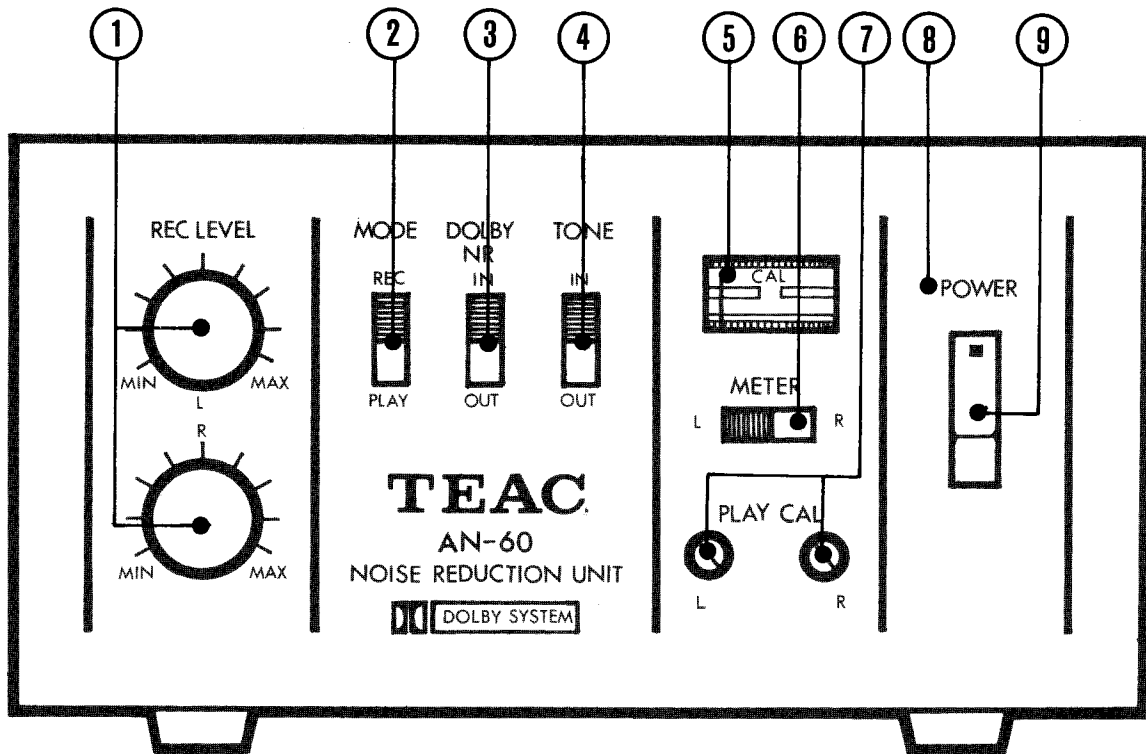
The TEAC AN-60 may be used with virtually any good quality tape decks. A calibration tape is supplied for both open reel and cassette deck calibration.

The TEAC AN-60 Noise Reduction Unit with the patented Dolby Noise Reduction System will enable you to make superior recordings at reduced tape speeds. The primary reason for using the higher speeds in the past, was to reduce tape hiss and noise as well as to provide increased high frequency response. With the AN-60 tape hiss is electronically reduced in amplitude so that it no longer limits tape quality. You will discover that the recordings made at slow speed with the Dolby process equal or surpass those made in the past at higher tape speeds, thus tape costs are drastically reduced. The AN-60 is also particularly useful when dubbing from one tape to another, formerly tape hiss noise build-up was inevitable, actually the tape noise doubled with each dubbing. With the Dolby process, this no longer occurs, tape hiss is eliminated.

The Dolby operates by encoding the signal as it is fed to your tape recorder. Upon playback the signal is decoded or returned to its original state. Therefore the Noise Reduction Unit must be connected between your tape deck and the recording source, be it an amplifier, preamp or receiver.

We know that you will want to begin using the AN-60 immediately however a few moments spent carefully studying the manual and the calibration procedures will be well spent. It is important that you thoroughly read and understand these procedures before placing the unit in operation.

Function of Controls



1. REC LEVEL (L & R):

These controls are used to regulate the level of the signal to be recorded. The tape deck controls are not used once the initial calibration has been performed. The recording signal level will normally be monitored on the tape deck VU meters. These controls have no effect during playback.

2. MODE (REC-PLAY) switch:

This switch determines the operating mode of the AN-60. To record, the switch must be in the REC position. To play a Dolby encoded prerecorded tape the switch must be placed at the PLAY position.

3. DOLBY NR (IN-OUT) switch:

Enables or disables the Dolby circuitry. To enjoy the noise reduction feature you must have the DOLBY switch IN. To play back non Dolby encoded tapes, place the switch at the OUT position.

4. TONE (IN-OUT) switch:

Actuates the recording calibration oscillator and produces a 400 Hz tone. Used only during recording level calibration. When calibration is completed always place switch at OUT position. Also make certain TONE is switched out before placing the mode switch at the PLAY position.

5. Dolby level meter:

Used during calibration to match the Dolby encoding and decoding signal threshold levels. May also be used in place of the VU meters if your tape deck has none. Recording and playback signals are displayed on this meter.

6. METER (L & R):

Switches the meter between channels. Only left or right channel information may be displayed at any single instant, not both channels.

7. PLAY CAL (L & R) adjustments:

Used to calibrate the playback components of your recorder with the Dolby decoding circuitry. Once properly adjusted they need not be reset unless the position of the deck's playback level controls have been changed.

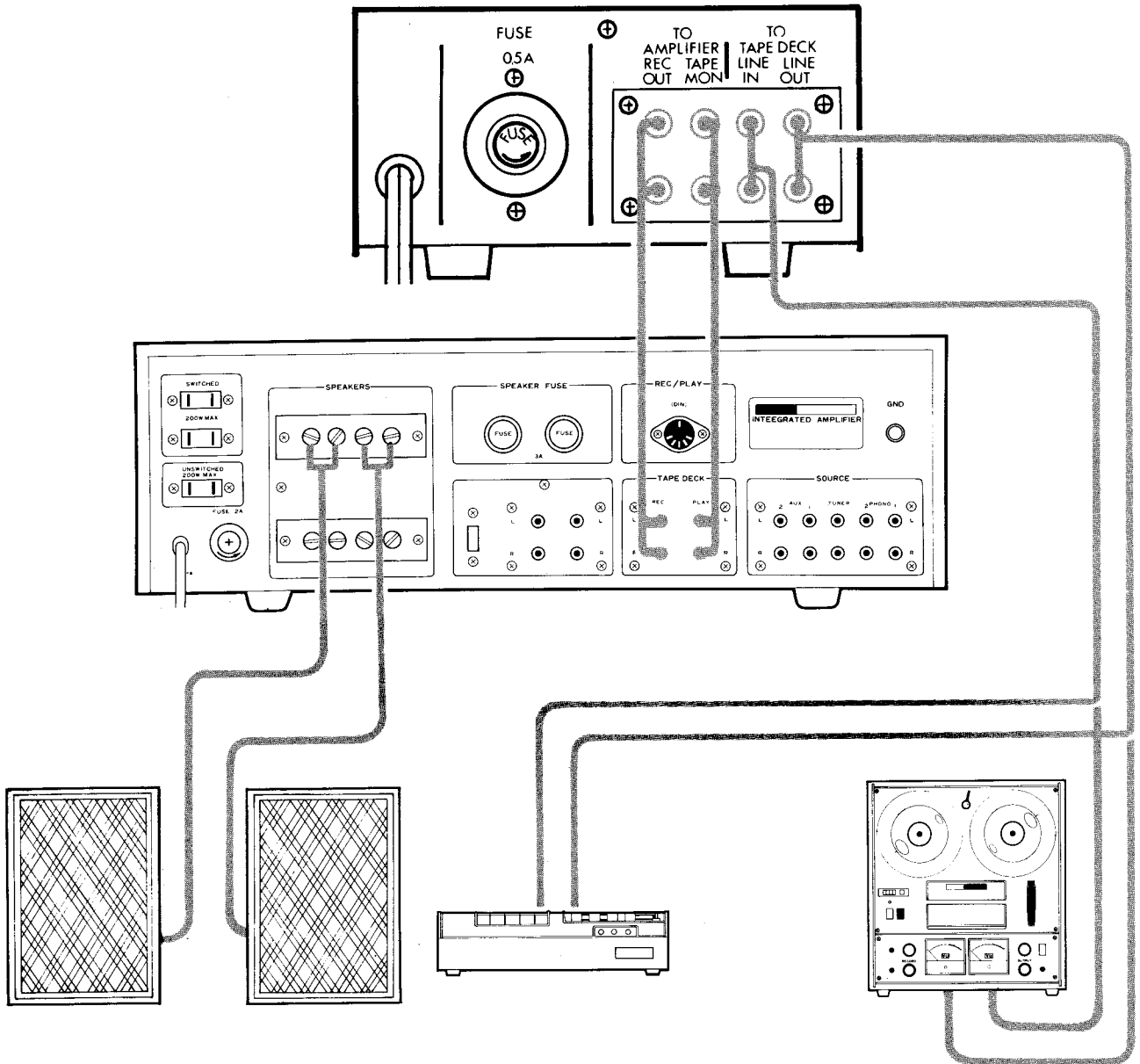
8. Pilot lamp:

Illuminates when AC power is applied to the AN-60.

9. POWER switch:

Controls AC power to the AN-60.

CONNECTING THE AN-60 TO YOUR AUDIO SYSTEM



CALIBRATION PROCEDURES

Initial calibration is required for two reasons, to match the AN-60 to your particular recorder and to make certain that the Dolby encoding and decoding signal levels are identical. The accuracy of these adjustments will determine the efficiency of the Dolby process. We suggest you thoroughly read this section before beginning the calibration procedures, then return to the beginning and accomplish the calibration step by step. Once properly accomplished these procedures usually need not be redone unless the tape deck control settings are disturbed or a major system component has been changed.

Recalibration should be periodically checked to be certain that control settings have not been changed. Also when changing from one brand of tape to another recalibration may be necessary.

● PLAYBACK CIRCUIT CALIBRATION

1. Turn on the AN-60 and your recorder.
2. Set the AN-60 controls as follows;
 - MODE switch to PLAY
 - METER switch to L
 - DOLBY NR switch to IN
 - TONE switch to OUT
3. Set tape deck MONITOR switch to TAPE position if applicable.
4. Place the Dolby calibration tape on the deck. For open reel recorders set the tape speed at 7-1/2 ips.
5. Play back the TEAC test tape as you would any prerecorded tape.
CAUTION: Do not accidentally place the deck in the record mode as the test tape will be ruined.
6. This step will vary with the tape recorder used.
 - a. If your deck does not have separate playback or output level controls proceed to step 7.
 - b. If your deck has output level controls and the meters on the deck display the playback level, adjust the deck output controls until both channel meters read "0", then proceed to step 7.
 - c. If the deck has no output meters, place the output level controls at mid point.

7. As the test tape plays, adjust the PLAY CAL (L) potentiometer so that the Dolby level meter reads at the Dolby reference line. Move METER switch to R, adjust the PLAY CAL (R) potentiometer so that the Dolby level meter reads at the Dolby reference line. Recheck both settings as the tape plays.
8. You have now properly calibrated the Dolby playback level. Do not disturb the deck's playback level controls. You may prefer to mark their positions with a felt tip pen or magic marker. From this point forward, playback volume settings are controlled by the power amplifier's volume controls. After prolonged system use periodic checks should be made to ascertain that control settings have not been changed.
9. Rewind the test tape to the beginning and remove it from the deck.

CAUTION: Your TEAC test tape represents the standard Dolby calibration level as used in all Dolby systems and components.

As such, it is a calibration standard and must be treated with respect. Never place it in strong magnetic fields such as exist near the power transformer of your audio equipment.

Keep it away from head demagnetizers or tape bulk erasers and speaker magnets. Exposure to strong magnetic fields will result in partial demagnetization with a resultant loss of output level and inaccuracy of subsequent calibrations.

● RECORDING CALIBRATION

Place the record level controls (LINE-IN) at approximately the 2 o'clock position.

As you calibrate the recording levels you will alternately be recording and playing back. Each time you record you must place the MODE switch in the REC position, during playback it must of course be in the PLAY position.

1. Place a blank tape on the recorder, set index counter to zero.
2. Set the tape deck so that its VU meters will display the incoming (source) signal. Place MONITOR switch to SOURCE if applicable. If deck has a PAUSE control, place the deck in the recording mode with the PAUSE control engaged to keep the tape from moving.
3. Position the controls of the AN-60 as follows;
MODE switch to REC
TONE switch to IN

DOLBY NR switch to IN

METER switch may be L or R

REC LEVEL control at MIN

4. With the TONE switch at IN position you are feeding a 400 Hz signal into your tape deck, adjust the deck's record level (LINE-IN) controls so that the VU meters will read approximately zero VU. If your deck does not have meters, use the point on your recording indicators where distortion or maximum recording level is indicated. If your recorder has "Cat Eye" indicators this would be the point just short of closure. This is an approximate adjustment at this point.
5. Release the PAUSE control and record 5 to 10 seconds of the 400 Hz tone. Place the TONE switch at OUT position.
6. Rewind the tape to the beginning (zero on the index counter). Place the AN-60 MODE switch at PLAY position. Place tape deck MONITOR switch at TAPE position if applicable. Play back the test recordings. As the 400 Hz tone is played back, alternate the meter switch between the L and R positions.

Note the reading on the AN-60 meter relative to the Dolby reference line. The ideal is to have the meter read exactly at the Dolby reference level. Chances of its doing so at the first attempt are slight.

Record the 400 Hz tone again as outlined in step 5. (Remember to place the MODE switch to the REC position.) Before recording the test tone adjust the tape deck LINE IN controls up or down depending on whether in step 6 the meter read above or below the Dolby reference line.

Play back the second recording of the 400 Hz tone. Note the position of the AN-60 meter to the Dolby reference line. Repeat the recording and playback procedure as often as necessary adjusting the tape deck LINE-IN controls each time, until the meter reads at the Dolby reference line on both channels during playback. This adjustment is important, mark the position of the deck record level controls with a felt tip pen upon completion of this procedure.

You have now completed the recording calibration procedure. From this point forward, the only controls you will operate on your recorder are those that control the mechanical functions. Do not disturb the settings of the playback or recording level controls unless you want to recalibrate the system.

RECORDING INSTRUCTIONS

With the AN-60 properly calibrated to your system you are now ready to make noise free recordings. While recording you will operate only the mechanical controls on your deck. Do not use the input or output level controls. They have been set during the calibration procedure and should not be disturbed.

The recording signal level will be monitored on the tape deck's monitoring devices, either VU meters, distortion indicators or "Cat Eye" indicators. The input signal level should be the same as that used when recording without the Dolby process. The signal level however, will be controlled by the REC LEVEL controls of the AN-60. In other words you will record exactly as you did before but the input signal levels are controlled from the AN-60.

MAKING A "DOLBY" RECORDING

1. Turn on your audio system, set the tape deck MONITOR switch to SOURCE position if applicable.
2. Place MODE switch to REC position.
3. Place DOLBY NR switch to IN.
4. Record the program material in your usual manner except that the input signal level is controlled by the AN-60 REC level controls.

PLAYBACK INSTRUCTIONS

Playing back a Dolby encoded recording:

1. Place the AN-60 DOLBY NR switch at IN position.
2. Place tape deck MONITOR switch to TAPE position if applicable.
3. Set AN-60 MODE switch to PLAY position. Play back the Dolby encoded tapes as you normally would, make final volume and balance adjustments with the power amplifier controls. Do not disturb the output control settings on the tape deck.

Playback of non-Dolby encoded tapes:

1. Place the AN-60 DOLBY NR switch at OUT position. Proceed as above.

CHANGING THE POWER LINE SETTING

The AC power source voltage to this equipment can be changed to either 100, 117, 200, 220 or 240 volts. It is set at the voltage indicated on the tag and outside of carton before shipment from the factory but can be changed to one of the other voltages mentioned above. To reset the voltage, unscrew the fuse in the center of the voltage selector plug, pull out the plug and reinsert it so that the desired voltage shows in the cutout, reinsert fuse.

* US Model is 117 V only.

USER MAINTENANCE

No user maintenance is required with the AN-60. Normal precautions against overheating should be observed. Do not place the unit where it is exposed to direct sunlight for extended periods of time.

SPECIFICATIONS

Frequency Response	20 - 15,000 Hz \pm 2 dB
Increased SN Ratio	10 dB at 10,000 Hz 5 dB at 1,000 Hz better than 6 dB overall (B weighting network)
Input Sensitivity	Line: 0.1 V
Input Impedance	Line: 35,000 ohms
Outputs	To tape deck input: 0.3 V Line : 0.58 V
Harmonic Distortion	below 0.5%
Multiplex Filter	better than -25 dB at 19k Hz
Channel Separation	better than 50 dB
Tone Oscillator	400 Hz
Power Requirements	100/117/200/220/240 V AC (US model is 117 V only.) 50/60 Hz, 2.5W
Dimensions	3-3/4"(H) x 6-5/16"(W) x 10-9/16"(D) [86 (H) x 160 (W) x 268 (D) mm]
Weight	4-3/8 lbs, [2 kg] net

* Features and specifications subject to change without notice.

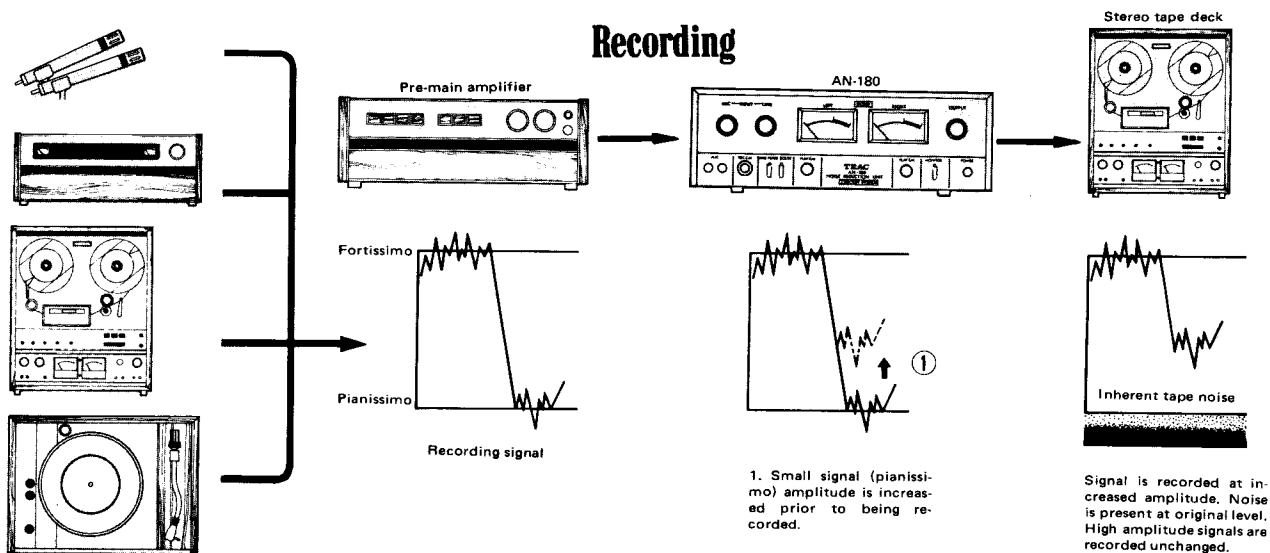
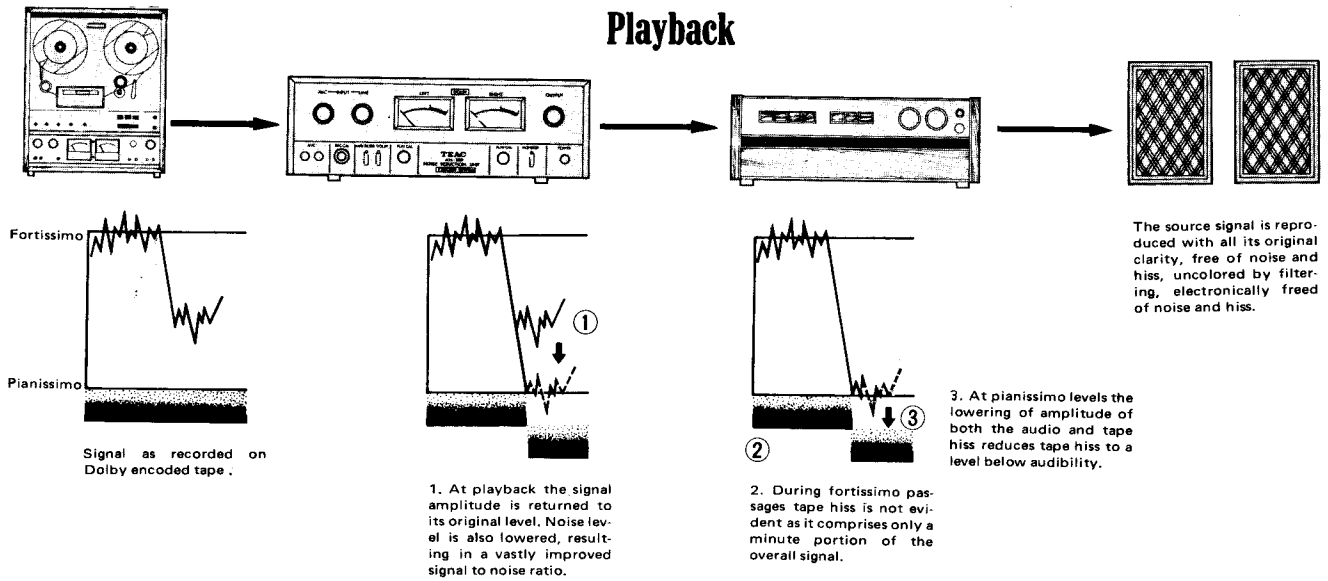
Standard Accessories

- * Test tape (open reel)
- * Test tape (cassette)
- * Input-output connection cord
- * Silicone cloth
- * Fuse
- * Screw driver

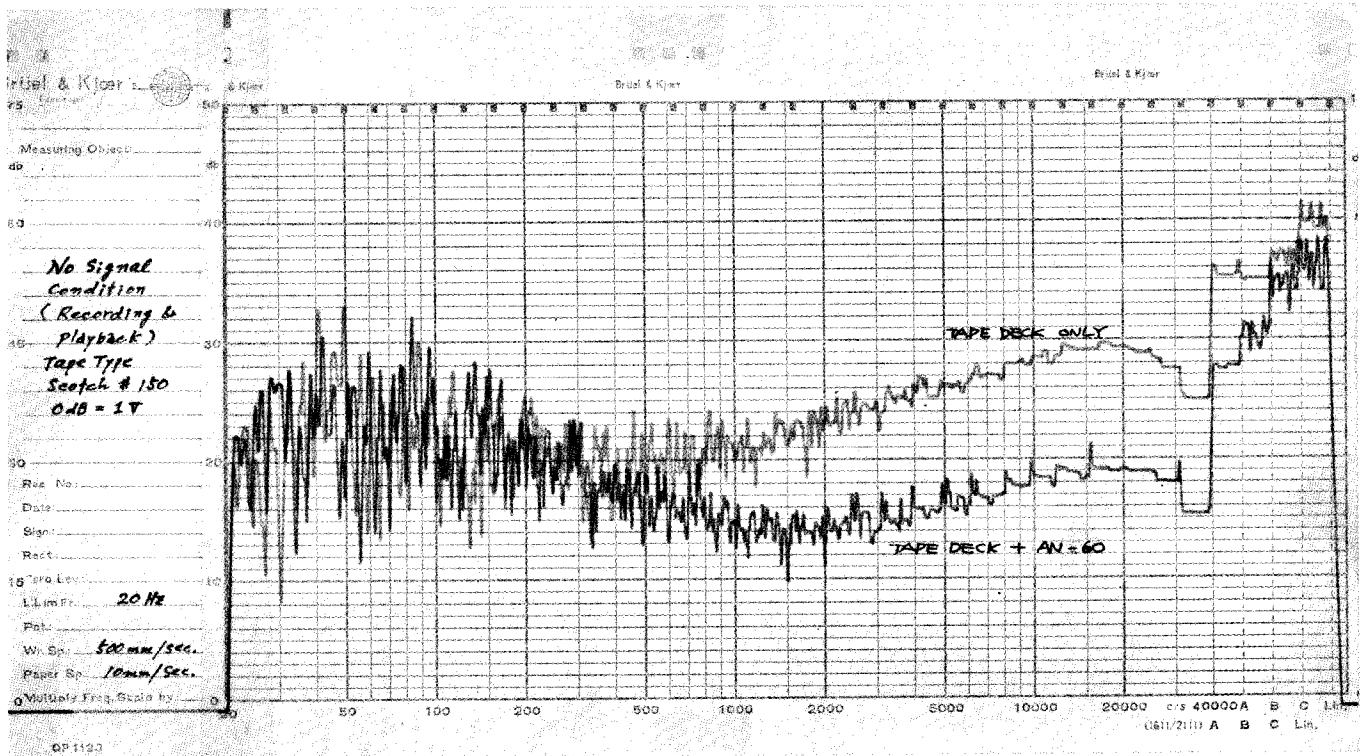
THE DOLBY NOISE REDUCTION SYSTEM

The Dolby process basically increases the amplitude of low level signals prior to their being recorded and decreases their amplitude by precisely the same amount (by use of a mirror image circuit) during playback.

During this process all inherent tape hiss and noises added by the recorder are eliminated or reduced to an inaudible level. At low signal levels where noise is most apparent, boosting is maximum, as signal levels rise, boosting is reduced. Overall signal to noise ratio is vastly improved, the original signal is reproduced completely free of coloration and free of noise and tape hiss. The Dolby System provides a SN ratio increase of 3 dB at 600 Hz, rising to 5 dB at 1,000 Hz and 10 dB at 4k Hz and above.



Noise Level Comparison Chart with and without Dolby Process



SERVICE

Should the equipment need repair, contact the dealer where it was purchased, or the Authorized TEAC Service Center nearest you.

- 1) The Warranty period is described in the enclosed warranty card, read the card for complete details.
- 2) For repairs after expiration of the warranty period a service charge will be made in addition to the price of repair parts.
- 3) If only repair parts are required, place your order with your dealer, or the nearest TEAC Authorized Service Center.

NOTE

Although the unit may still be under the Warranty period, you may be charged for repairs made necessary by misuse, or damage incurred as a result of improper operation.

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